set of channel state information is for the second radio frequency chains. 18. The apparatus of example 17, wherein the channel state information for the certain set is different from the channel state information for the other set.

[0080] 19. The apparatus of example 1, further comprising one or more processors and one or more memories including computer program code, wherein the one or more memories and the computer program code configured, with the one or more processors, to cause the apparatus to perform at least the following: to select precoding to meet a selected number of multiple beams and corresponding user equipment; to select sets of multiple antennas for the second radio frequency chains; to configure sets of the second radio frequency chains corresponding to the selected multiple antennas to provide over-the-air combining of less than full rate switched signals. 20. The apparatus of example 1, further comprising one or more processors and one or more memories including computer program code, wherein the one or more memories and the computer program code configured, with the one or more processors, to cause the apparatus to perform at least the following: to perform coarse precoding of the antenna array to meet a selected number of multiple beams and user equipment, the coarse precoding using the plurality of second radio frequency chains; and to perform fine precoding of the antenna array to meet the selected number of multiple beams and the user equipment, the fine precoding using the plurality of first radio frequency chains. 21. The apparatus of example 1, further comprising using the antenna array to perform beamforming with multiple beams to multiple user equipment.

[0081] 22. An apparatus, comprising: a base station comprising: a plurality of first radio frequency chains configured to be able to be coupled to a plurality of first antennas from an antenna array; and a plurality of second radio frequency chains configured to be able to be coupled to a plurality of second antennas from the antenna array, wherein the first and second antennas are different; wherein the first and second radio frequency chains are configured to create radio frequency signals from baseband signals, wherein the first radio frequency chains have a certain functionality, and wherein the second radio frequency chains have a reduced functionality relative to the certain functionality of the first radio frequency chains.

[0082] 23. A method, comprising: for an apparatus comprising a plurality of first radio frequency chains able to be coupled to a plurality of first antennas from an antenna array, configuring a plurality of second radio frequency chains to perform precoding of the antenna array to meet a selected multiple number of beams to multiple users, wherein the plurality of second radio frequency chains are configured to be able to be coupled to a plurality of second antennas from the antenna array, wherein the first and second antennas are different, wherein the first radio frequency chains also perform precoding of the multiple number of beams to the multiple users, wherein the first and second radio frequency chains are configured to create radio frequency signals from baseband signals, wherein the first radio frequency chains have a certain functionality, and wherein the second radio frequency chains have a reduced functionality relative to the certain functionality of the first radio frequency chains; and performing beamforming with the multiple beams to the multiple users.

[0083] 24. The method of example 23, wherein the certain functionality of the first radio frequency chains is based at least in part on a plurality of features and wherein the second radio frequency chains have a reduced functionality because one or more features for the second radio frequency chains are relaxed relative to identical one or more features for the first radio frequency chains.

[0084] 25. The method of example 23, wherein at least one of the first radio frequency chains comprises a second power amplifier able to amplify a signal over a range of powers, and wherein at least one of the second radio frequency chains comprises a power amplifier having only two states: an on state where the power amplifier transmits at full power; and an off state where the power amplifier is silent.

[0085] 26. The method of example 25, wherein at least one of the first radio frequency chains runs a first rate and wherein the method further comprises switching the power amplifier for the at least one of the second radio frequency chains between the on and off states at a rate that is less than the first rate.

[0086] 27. The method of example 25, wherein at least one of the first radio frequency chains runs at first rate and wherein the method further comprises switching a signal coupled to the output of the power amplifier for the at least one of the second radio frequency chains between an output routed toward the antenna and between a resistor to ground, wherein the switching occurs at a rate that is less than the first rate and the power amplifier is kept in the on state.

[0087] Embodiments (or portions thereof) of the present invention may be implemented in software (executed by one or more processors), hardware (e.g., an application specific integrated circuit), or a combination of software and hardware. In an example embodiment, the software (e.g., application logic, an instruction set) is maintained on any one of various conventional computer-readable media. In the context of this document, a "computer-readable medium" may be any media or means that can contain, store, communicate, propagate or transport the instructions for use by or in connection with an instruction execution system, apparatus, or device, such as a computer, with one example of a computer described and depicted, e.g., in FIG. **4**. A computer-readable medium may comprise a computer-readable storage medium (e.g., memory(ies) **425**, **455** or other device) that may be any media or means that can contain or store the instructions for use by or in connection with an instruction execution system, apparatus, or device, such as a computer. A computer readable storage medium does not, however, encompass propagating signals.

[0088] If desired, the different functions discussed herein may be performed in a different order and/or concurrently with each other. Furthermore, if desired, one or more of the above-described functions may be optional or may be combined.

[0089] Although various aspects of the invention are set out in the independent claims, other aspects of the invention comprise other combinations of features from the described embodiments and/or the dependent claims with the features of the independent claims, and not solely the combinations explicitly set out in the claims.

[0090] It is also noted herein that while the above describes example embodiments of the invention, these descriptions should not be viewed in a limiting sense. Rather, there are several variations and modifications which may be made without departing from the scope of the present invention as defined in the appended claims.